

Lesson 1



What Is a Population?

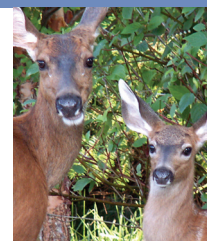
The study of ecology involves investigating ecosystems, organisms in ecosystems, and the exchange of energy and nutrients among organisms and their environments. In this lesson, students learn that the way the term population is used in ecological studies is somewhat different from the way it is used in everyday language.

To understand how populations of organisms function in ecosystems, students must understand what a **population** is.

Students read *California Connections* about the natural history of the wolverine in the Sierra Nevada region

of California. Through the story's discussion of the populations of various organisms, students are introduced to the term "population." The students use various resources, including dictionaries and their textbooks, and conduct interviews to develop an

understanding of the term. This understanding provides the basis for the rest of the unit, which explores how populations of organisms are categorized by the functions they serve in **ecosystems**.



Background

By the sixth grade, most students are familiar with the term “population,” but may not understand its use in the field of ecology. Many people define population from a human perspective, that is, how many people live in a place. Dictionary definitions will vary slightly. The scientific definition is more precise and somewhat different from most dictionary definitions.

Merriam-Webster’s Online Dictionary (2006-07) defines population as: (1a) the whole number of people or inhabitants in a country or region; (1b) the total of individuals occupying an area or making up a whole; (2) the act or process of populating; (3a) a body of persons or individuals having a quality or characteristic in common; (3b1) the organisms inhabiting a particular locality; (3b2) a group of interbreeding organisms that represents the level of organization at which speciation; (4) a group of individual persons, objects, or items from

Learning Objective

Define a population.



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which samples are taken for statistical measurement.

In biological or ecological studies, a population is generally considered a group of individuals of a given species living in a given area at a given time,

or the number of individuals of a species living in an area at a given time. The scientific meaning has three parts: (a) the species, (b) the area or place, and (c) the time (when). The term can refer to a number or a group of **organisms**. Note: Elementary texts often omit the time part of the definition, but it is important for students to understand that populations change with time.

In addition to animals, ecosystems have populations of plants, bacteria, and fungi.

Scientists categorize populations of organisms by the functions they serve; for instance, are they producers, consumers, or decomposers?

Key Vocabulary

Population: (a) the number of a particular type of organism living in a place at a given time; (b) the organisms themselves.

Ecosystem: Groups of interacting and/or interdependent biotic and abiotic components or factors in a specific area.

Habitat: The place where an organism lives and meets its needs.

Natural systems: The interacting, interdependent components, processes, and cycles among organisms and their habitats.

Organism: A living plant, animal or other life form capable of metabolic activity and reproduction.



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Caption to come

Toolbox



Summary of Activities

Students compare and contrast the definitions of the term population as given by: (a) a dictionary, (b) their science text or teacher, (c) classmates and parents, and (d) background information provided in this lesson.



Instructional Support

See Unit Resources, page 21

Prerequisite Knowledge



- Students should be able to use a dictionary and understand that dictionaries often give several definitions for a word.
- Students should understand the sixth-grade science content standards 5.a. (energy transfer through photosynthesis and food chains) and 5.b. (food webs and decomposition).

Advanced Preparation

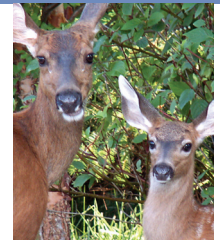


Make copies:

Make copies as indicated in the Activity Masters section below.

Produce transparencies:

Make transparencies of “Wolverine in Its Habitat,” “Classroom Populations,” and “Populations in Nature.”



Materials Needed



Student dictionaries:

Approximately six per class

Activity masters:

See below

Visual Aids



Transparencies:

- Wolverine in Its Habitat, page 99
- Classroom Populations, page 100
- Populations in Nature, page 101-102

Duration



Preparation time:

15 min.

Instructional time:

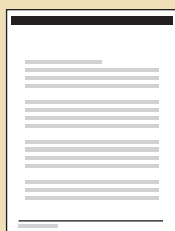
60 min.



Safety Notes

None

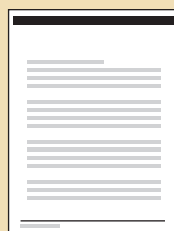
Activity Masters



Where Are the Wolverines - Part 1

Page 72

One per student



What Is a Population?

Page 73

One per student

Procedures

Step 1

Use the **Wolverine in Its Habitat** (Lesson 1 Visual Aid) transparency to introduce the “mystery animal.” Ask students if anyone can identify this animal. Discuss their responses. Tell them the animal is a wolverine.

Step 2

Read Part 1 of *Where Are the Wolverines?* After reading Part 1, note that it mentioned the populations of several organisms such as the wolverine, the deer, and the sheep. Point out those organisms on the transparency.

Step 3

Read the following sentences to the students and ask them what is meant by the term population in each example. (In the first example, population refers to a number of people even though it does not specifically say people. In the second example, it refers to the actual group of people. In the third example, it refers to the number of deer.)

- The population of the United States is over 300 million.
- The population of the city was exposed to the dangerous chemical.
- The population of deer has increased since the wolves were removed.

Discuss the fact that the word population has somewhat different meanings in each of the above examples, and that scientists use precise meanings of words.

Step 4

Distribute the Activity Master **What Is a Population?** (Lesson 1 Activity Master). Review the instructions and provide time for students to look up dictionary meanings of “population.” (On the following day, ask students to share the responses given by parents and others.).

Step 5

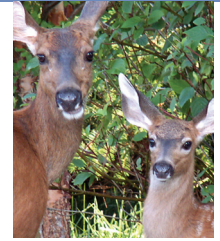
Provide the students with the scientific definition of the word “population.” Be sure to include the three aspects of the definition: (a) the number of a particular type of organism (what), (b) in a place (where), (c) at a given time (when). Ask the students to identify the populations shown on the **Classroom Populations** (Lesson 1 Visual Aid) and **Populations in Nature** (Lesson 1 Visual Aid) transparencies. Guide a discussion about the scientific meaning of the word “population.”

Step 6

Ask several students to state the populations in the classroom (humans, fish, hamsters/rabbits).

Step 7

Revisit the *Where Are the Wolverines?*—Part 1 and discuss the various populations mentioned (*wolverines, hoary marmots, deer, mice gophers, pikas, grizzly bears, humans*).



Lesson Assessment

Instructions

Description:

The EEI Learning Objective for Lesson 1 states that students will define a population. Assessment of student learning will be determined through the use of a writing assignment that will include two questions and a writing prompt.

Instructions:

Teacher Instructions:

Write the following assessment questions and writing prompt on the board. Have students copy this information on a piece of paper or on a page in their reflection journals. Instruct students to answer the questions thoroughly. Collect their papers or journals when done.

Student Instructions:

Lesson 1: What is a Population?

On a piece of paper (or in your reflection journal) answer the following two questions and write a one sentence response to the writing prompt. The point value for each part of this assessment is provided. When finished submit your work to your teacher for scoring.

1. List the three parts of the scientific definition of the word "population."

(3 points)

2. How is the scientific definition of the term population different from what you thought it was before this lesson?

(2 points)

3. Write a sentence that demonstrates your understanding of the scientific meaning of the word "population."

(5 points)

Suggested Scoring

Scoring Method:

Students will submit work to teacher who can score or pass out to class to peer-score. The total possible point value is 10 points.

1. List the three parts of the scientific definition of the word population.

(3 points)

Answer: the species (what organism),
the area/place/location (where), the
time (when)

2. How is the scientific definition and use of the term population different from common usage of the word?

(2 points)

Example: Many people think of population as how many people (a number) are in a certain place. Scientists are more specific and don't use numbers. They talk about the specific species of organisms, the location where the species is observed and when they were observed.

3. Write a sentence that demonstrates your understanding of the scientific meaning of the word "population."

Example: Our class was studying ecosystems and visited Walden Pond last Wednesday and saw Canadian Geese.

(5 points)